

**AMENDMENTS TO THE CLAIMS**

**This listing of claims will replace all prior versions and listings of claims in the application:**

**LISTING OF CLAIMS:**

**1-29 (canceled)**

**30. (currently amended):** A sensor system for measuring the concentration, or indicating the presence or presence at a predetermined level of, a target contaminant species in an aqueous medium comprising a sensor element having a sample receiving area for receiving a sample of aqueous medium to be sampled and which comprises at least three electrodes each comprising a layer of metallic conductor ~~comprising noble metals of high purity selected from the group consisting of silver, gold, platinum, and palladium in substantially pure form or as alloyed combinations thereof~~ deposited upon an insulating substrate; and further comprising a power source adapted to apply a pre-determined potential difference across two of the electrodes, in use working and counter electrodes, determined by the potential associated with an electrochemical reaction characteristic of the target species, and output means to output data corresponding to the current generated thereby when a sample is in place in the sampling area; and further comprising a pH buffering agent and a reference reagent to be ~~combined with~~ added to a test solution when it is placed for testing on the sample collection area, the buffering agent being selected to adjust the pH of the sample to a value necessary for the characteristic electrochemical process to be tested and the reference reagent ~~being selected comprising sodium chloride~~ to cause chloride ions to go into solution in the aqueous medium sample to be tested to create a suitable reference solution and to create a reference electrode in situ on the device in use

which comprises an Ag/AgCl (chloride) reference electrode for the characteristic electrochemical reaction.

31. (canceled).

32. (currently amended): A sensor system in accordance with claim 31-30 wherein the buffering agent is selected to vary the pH of the initial solution to free into solution a species related to and indicative of the contaminant species under test, the characteristic electrochemical process to be tested by the sensor being one involving this related species.

33. (previously presented): A sensor system in accordance with claim 30 adapted for an ammonium/ ammonia ion target species wherein the reference reagent comprises sodium chloride and the buffering agent is selected to be such as in use to change the pH of the test solution in excess of 11.

34. (previously presented): A sensor system in accordance with claim 33 wherein the buffering agent comprises  $\text{Na}_3\text{PO}_4$ .

35. (previously presented): A sensor system in accordance with claim 30 adapted for nitrate/ nitrite ion target species wherein the reference reagent comprises sodium chloride and the buffering agent is selected to be such as in use to change the pH of the test solution to about 6.8.

36. (canceled).

37. (canceled).

38. (canceled).

39. (currently amended): A sensor system in accordance with claim 30 wherein a power source is integrated into a circuit with the sensor such that the sensor is caused to function as a steady-state potentiostat.

**40. (previously presented):** A sensor system in accordance with claim 39 wherein the power source comprises control means such as to act in combination with the sensor to create a differential pulsed square wave voltammetric circuit.

**41. (previously presented):** A sensor system in accordance claim 30 wherein the power source is a portable electrical power source for use in the field.

**42. (previously presented):** A sensor system in accordance with claim 30 further comprising display means to display the output data in a user readable form.

**43. (previously presented):** A sensor system in accordance with claim 30 wherein the insulating support substrate has hydrophobic surface properties to assist in the retention of a static sample in the sample collection area.

**44. (previously presented):** A sensor system in accordance with claim 30 wherein the at least three electrodes are deposited on a single supporting substrate.

**45. (previously presented):** A sensor system in accordance with claim 30 wherein at least some of the at least three electrodes are provided concentrically in the sample area.

**46. (currently amended):** A sensor system in accordance with claim ~~45~~30 wherein three electrodes are provided and the electrodes comprise a first electrode making up a central generally circular portion, and second and third electrodes concentrically annular or partially annular there around.

**47. (currently amended):** A sensor system in accordance with claim ~~45~~30 wherein four electrodes are provided and the electrodes comprise a first electrode making up a central generally circular portion, and second and third annular electrode portions concentrically annular or partially annular there around, wherein, one or other of the outer annular electrode areas is divided into two mutually insulating portions, to comprise two of the four electrodes.

**48. (previously presented):** A sensor system in accordance with claim 30 wherein the sensor includes temperature measuring means and/or means to input a measured temperature at the time of sampling, and further comprises means to make a temperature compensation to raw output data based upon this temperature measurement relative to standard conditions.

**49. (previously presented):** A sensor system in accordance with claim 30 wherein the sensor includes conductivity measuring means to measure solution conductivity, and further comprises means to make a compensation to raw output based upon this measurement relative to standard conditions if necessary.

**50. (currently amended):** A method of measuring the ~~concentration~~concentration, or indicating the presence or presence at a predetermined level of a target contaminant species in an aqueous medium comprising the steps of:

applying a sample of aqueous medium to be tested on a sample collection area of a sensor element comprising at least three electrodes each comprising a layer of metallic ~~conductor~~  
~~comprising noble metals of high purity selected from the group consisting of silver, gold, platinum, and palladium in substantially pure form or as alloyed combinations thereof~~ deposited upon an insulating substrate;

~~combining~~adding to the test solution with a pH buffering agent and a reference reagent, the buffering agent being ~~selected to~~Na<sub>2</sub>PO<sub>4</sub>, adjust the pH of the sample to a value acceptable and necessary for an electrochemical process to be tested characteristic of the target species and the reference reagent being ~~selected~~sodium chloride to cause chloride ions to go into solution in the aqueous medium to be tested to create a suitable reference solution ~~for the characteristic electrochemical process~~and to create in situ a reference electrode on the device comprising an Ag/AgCl (chloride) reference electrode;

connecting the electrode to a power source to set up a control circuit;  
applying a pre-determined potential difference determined by the potential associated with the electrochemical reaction characteristic of the target species;  
awaiting the establishment of a quasi steady state;  
outputting data associated with the current of said quasi steady state.

**51. (canceled).**

**52. (previously presented):** A method in accordance with claim 50 wherein sodium chloride is added to a solution concentration of about  $30 \text{ g l}^{-1}$ .

**53. (previously presented):** A method in accordance with claim 50 for an ammonium/ ammonia ion target species wherein the method comprises adding a sodium chloride reference reagent and a buffering agent to change the pH of the test solution to in excess of 11.

**54. (previously presented):** A method in accordance with claim 53 wherein the buffering agent comprises  $\text{Na}_3\text{PO}_4$ .

**55. (previously presented):** A method in accordance with claim 50 for nitrate/ nitrite ion target species wherein the method comprises adding a sodium chloride reference reagent and a buffering agent to change the pH of the test solution to about 6.8.

**56. (previously presented):** A method in accordance with claim 50 comprising the further steps of converting the said output current data into data indicative of the presence or presence at a pre-determined level and/or level of concentration of the target species in the sample;

and/or displaying the output data or converted data on suitable user readable display means;

and/or transmitting the output data or converted data to suitable data storage and/or processing means.

**57. (previously presented):** A method in accordance with claim 50 wherein the said reference/ buffer reference solution is created by addition of a suitable reference reagent and buffering agent to the collected sample.

**58. (canceled).**

**59. (new):** A method in accordance with claim 50, wherein the control circuit is a potentiostatic steady-state type circuit.

**60. (new):** A method in accordance with claim 50, further comprising the steps of:  
taking a test sample of a quantity of a few millimeters from a bulk sample to be tested;  
and  
placing the test sample on the sample collection area for testing as a static sample.